



State Mindful Attention Awareness as a Dyadic Protective Factor During COVID-19: a Daily Diary Study

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Abstract

Objectives Accumulating evidence suggests that mindfulness, as a trait, can be a form of personal resilience to stress. However, mindfulness is considered a present-moment state which makes it important to focus on its state-level (vs. trait-level) effects. Modern theories of stress suggest that coping with stress often involves interpersonal processes, and it is therefore valuable to clarify mindfulness interpersonal (vs. intrapersonal) stress-buffering effects. The current study examined mindful attention awareness as a dyadic protective factor at the start of the COVID-19 pandemic.

Methods A convenience sample of 72 cohabiting romantic couples participated in a 21-day daily diary study. The background (pre-diary) questionnaire assessed their experience of COVID-related stressors (e.g., financial and health-related burdens). The diary assessed state mindful attention awareness, mood, COVID-related stress, relationship satisfaction, and perceived partner responsiveness (PPR).

Results A series of Actor-Partner Interdependence Multilevel Models were used to analyze the dyadic data. Actor state mindful awareness was associated with better daily personal (mood and stress) and relational (PPR and satisfaction) outcomes. Partner state mindful awareness was associated with higher PPR. Actor state mindful awareness also attenuated the association between pre-diary COVID-related stressors and daily COVID-related stress.

Conclusion State mindfulness may serve as a dyadic protective factor when couples face stressful circumstances.

Keywords Mindfulness · COVID-19 · Daily diaries · Romantic partners

The COVID-19 pandemic has engendered multiple sources of stressors, including health concerns, financial strain, and social difficulties (Bareket-Bojmel et al., 2020; Torales et al., 2020). Traditional models of stress (Lazarus & Folkman, 1984) tend to focus on intrapersonal stress processes, such as the extent to which individuals' appraisal of these stressors (the objective demand; e.g., the effect of the pandemic on individuals' financial situation) affects their experience of stress (the subjective response to the pandemic; e.g., tension, anxiety, health concerns).

It is currently widely accepted, however, that the interpersonal context is key to understanding these processes (Bodenmann, 2000; Falconier et al., 2016; Randall &

Bodenmann, 2017). For many adults, their romantic relationship constitutes one of their most meaningful social bonds (Snyder et al., 1989) and has been shown to be robustly associated with people's mental and physical well-being (Cornwell & Waite, 2009; Kiecolt-Glaser & Wilson, 2017; Whisman & Baucom, 2012). It is thus unsurprising that several modern models of stress have highlighted the role of romantic relationships in coping with stressors and the effects of dyadic coping on partners' subjective levels of stress.

For example, Bodenmann's (2005) systemic transactional model (STM) posits that dyadic coping often involves several dyadic processes, including stress communication and dyadic stress coping. When confronted with stress, partners can reveal their concerns, explore dyadic resources, and establish a shared perspective on how to manage it (Cutrona et al., 2018). However, when dyadic coping is dysfunctional, the external stressors can spill over into the relationship and impair the couple's relationship satisfaction (Randall & Bodenmann, 2009).

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Pietromonaco and Overall (2021) adapted the vulnerability-stress-adaptation model (VSA; Karney & Bradbury, 1995) and presented a conceptual framework of the ways in which COVID-related stressors can erode partners' relationship functioning. Specifically, they argued that COVID-related stressful events interact with partners' enduring vulnerability to affect whether couples will engage in maladaptive processes (e.g., hostility, poor support) to manage and cope with stress. A survey study showed that COVID-related stressors (e.g., quarantine, financial strain) were associated with lower relationship quality (Balzarini et al., 2020). Consistent with the vulnerability-stress-adaptation model, certain vulnerability factors were found to exacerbate this effect. For example, partners' attachment insecurity and depression were shown to augment the association between COVID stressors and low relationship satisfaction (Overall et al., 2022). The model further suggests that existing personal strengths can mitigate the adverse effects of stress.

Mindfulness is considered to be one such potential protective factor in the context of stress (Brown & Ryan, 2003). Mindfulness is defined as an awareness that arises from attending to the present moment without reactivity to internal/external stimuli (e.g., thoughts, feelings, bodily sensations, others' reactions; Kabat-Zinn, 1991). When in a state of mindfulness, people attune their consciousness to the here and now, and observe stimuli in a non-judgmental way, without attributing a specific meaning to them (e.g., bad, pleasant; Glomb et al., 2011).

Several studies have examined mindfulness meditation training programs (Creswell, 2017), or as a trait (i.e., dispositional tendency; Brown & Ryan, 2003). The findings suggest that trait mindfulness is associated with better well-being, mood, self-regulated behaviors, and reduced levels of stress (Brown & Ryan, 2003). Trait mindfulness can also buffer stressful life circumstances. For example, mindfulness has been associated with lower daily job exhaustion and work-related stress (De Jong et al., 2013; Grover et al., 2017). Mindfulness has been associated with less distress among cancer patients (Brown & Ryan, 2003), and with better coping with pain in fibromyalgia patients (Grossman et al., 2007). Thus, it is likely that mindfulness may play a protective role in the face of COVID-19; i.e., it may be associated with better psychological adjustment during these challenging times.

Even though mindfulness is considered a personal asset, a growing body of research has documented the beneficial effects of trait mindfulness in the interpersonal domain, especially in the context of romantic relationships (Baer, 2003; Kabat-Zinn, 1991; Wachs and Cordova, 2007). A recent meta-analysis found a positive ($r=0.24$) association between mindfulness and relationship satisfaction (Quinn-Nilas, 2020). Similarly, trait mindfulness has been associated

with lower levels of attachment anxiety and avoidance (Hertz et al., 2015; see also Don & Algoe, 2020).

Karremans et al. (2017) proposed a conceptual framework capturing the mechanisms accounting for these positive relational effects of mindfulness. The model differentiates between basic mechanisms facilitated by mindfulness (e.g., emotional regulation, awareness of implicit processes) and relational processes encouraged by these basic mechanisms (e.g., pro-relationship cognitions/motivations, stress coping strategies). For example, by recognizing the transient nature of negative emotions, mindfulness states often allow for a better regulation of distress. This attenuated experience of distress may enable individuals to be more attuned to their partners' needs (Conversano et al., 2020). Studies have shown that greater mindful awareness of the experience and the origin of a stressor external to their relationship (e.g., job demands) may help partners better differentiate between the external distress and their feelings in the relationship, thus mitigating the likelihood for partners to experience "stress spillover" (i.e., the negative impact of external stressor on the relationship; Neff & Karney, 2017).

Most studies on the relational effects of mindfulness have focused on actor effects (e.g., the association between partner A's mindfulness and partner A's relational satisfaction). By contrast, few have documented its beneficial effects on one's partner; i.e., partner effects (e.g., the effect on partner B's relational satisfaction). People's trait mindfulness has been found to be associated with partners' relationship satisfaction, perceived partner responsiveness, and lower mood instability (Adair et al., 2018; Cox et al., 2020; Harvey et al., 2019; Iida & Shapiro, 2019; Lenger et al., 2017). These results suggest that in the context of the COVID-19 pandemic, the effects of mindfulness may be associated with both actors' and partners' better relational and personal outcomes.

In addition, most studies have assessed mindfulness as a trait. However, many theories of mindfulness focus on the importance of understanding the extent to which people are mindful at the present moment (i.e. state mindfulness)—being present without reactivity in a particular moment in time (Brown & Ryan, 2013; Pirson et al., 2018). Hence, a person who is mindful at certain moments may also be less mindful at others, thus making within-person variability in this construct crucial to examine. Studies have shown that these fluctuations in state mindfulness are associated with better emotional regulation (e.g., use of cognitive reappraisal), and with less anger, rumination, and lower aggression (Eisenlohr-Moul et al., 2016; Garland et al., 2015).

To the best of our knowledge, no study to date has examined the effects of state mindfulness in the relational domain. Several studies have reported that trait or practiced mindfulness is associated with partners' daily experiences. For example, Iida and Shapiro (2019) found that people's trait

mindfulness was associated with lower emotional instability in their partners. During the weeks in which individuals practiced daily meditation, their partners experienced lower daily negative affect (May et al., 2020). Thus, state mindfulness may be associated with partners' better daily adjustment (e.g., lower stress, higher satisfaction) during the COVID-19 outbreak.

The main goal of the current study was to adopt a dyadic approach to test the protective effects of mindful attention awareness on individuals' own and their partners' personal and relational well-being. We focused on one facet of mindfulness; namely, mindful attention awareness, which is defined as a state of being attentive to what is occurring in the present. Utilized daily data collected from cohabiting couples soon after the outbreak of the pandemic we tested four hypotheses: state mindful attention awareness should be associated with better daily relational and personal outcomes, for actors (Hypothesis 1) and their partners (Hypothesis 2); state mindful attention awareness should buffer the negative effects of COVID-related stressors (e.g., economic burden) on the actor's (Hypothesis 3) and partner's (Hypothesis 4) daily relational and personal outcomes.

Method

Participants

In May 2020, romantic cohabiting couples, who were at least 18 years old and had routine access to the internet, were recruited by undergraduate students from a large university in Israel enrolled in a research seminar. Specifically, using a snowball-like sampling procedure, the seminar students first contacted romantic partners to ask them to participate in the study. To guarantee the participants' confidentiality, the data were de-identified. During the recruitment period in April 2020, Israel went through its first wave of the COVID outbreak, and a general lockdown went into effect. Travel for non-essential activities was restricted to 100 m (328 ft) around the home (including work), and social distancing regulations were put in place including for family. During the study period, starting in early May 2020, these restrictions were gradually relaxed but were not entirely lifted by the end of the study. For example, the public was required to wear masks in public and remain in quarantine for 2 weeks after exposing to COVID.

Eighty-eight couples completed the initial background questionnaire. Of these, 11 couples dropped out before ($N=1$) or during ($N=10$) the daily diary period. Five other couples were excluded from the analysis due to failure to complete 10 diary entries during the diary period. Hence, the final sample was composed of 72 couples (82.8% retention rate). Of these 72 couples, four self-identified as

same-gender ($n=2$ female-female couples and $n=2$ male-male couples). Of the 144 participants in the study, 72 self-identified as men and 72 participants as women. The men's mean age was 29.9 years ($SD=8.6$, range = 23–58) and the women's mean age was 28.7 years ($SD=7.7$, range = 23–57). The participants had at least a high school education, and 54% had a college degree. Couples reported an average relationship duration of 7.0 years ($SD=7.3$ years, range = 13 months–37 years). Forty percent of the couples were married, and 20% had children.

Procedure

The partners were first asked to complete an initial background questionnaire, were introduced to the web-based diary, and were instructed on its use. Then, for 21 days, a unique link to the diary questionnaire was sent to the participants' emails every evening at 8:00 PM. Participants could also opt to receive a daily SMS reminder on their cell phones. Diaries were completed using a link to a secure online data collection platform, which became inactive the following morning. Participants were asked to complete the questionnaire within an hour before going to sleep. In the case of missing diary entries for two consecutive days, the participants were contacted by a research assistant. Participants completed an average of 18.99 ($SD=2.66$) daily diary entries (90.4% compliance). At the end of the study, the couples were entered into a raffle for two vacation vouchers (worth approximately US\$140).

Measures

Background Questionnaire

In the background questionnaire, collected the day before the diary period started, participants were asked to rate the impact on them of COVID-19-related stressors using four items, each on a 6-point scale ranging from 0 ("not at all") to 5 ("extremely"), with the heading "the following questions concern the influences of COVID-19 on your life". The mean of the four items was used to index the actor COVID-19-related stressor level: (1) "How much has the crisis adversely affected you financially?"; (2) "How much has the crisis adversely affected your health?"; (3) "How much has the crisis adversely affected your studies/employment?" and (4) "How much has the crisis adversely affected you as a parent?". The sum of these items was used to index COVID-19-related stressor index. This measure was developed by the research team soon after the outbreak of the pandemic, when psychometrically sound measures for assessing COVID-related stressors had yet to be developed. Note that this measure captured most of the pandemic domains identified in a more recent questionnaire (Tambling et al., 2021).

Diary Questionnaires

Participants' *mindful attention awareness* was assessed daily using a state-level version of the MAAS (Mindful Attention Awareness Scale; Brown & Ryan, 2003). This questionnaire, adapted by Brown and Ryan to assess state mindfulness, includes 5 items taken from the trait-level 15-item version of the MAAS. To reduce participants' burden (Eisele et al., 2022), only the 3 items that showed the highest loading as reported in the scale's development sample were administered. However, to ensure consistency with the original 5-item scale, we ran a small-scale study in which we asked 110 volunteer participants to complete the 5-item version and found a high correlation ($r=0.92$) between the average total score computed with the five items that were originally used in Brown and Ryan, and the three items that were used in the current study. Items were rated on a 6-point scale, ranging from 1 ("almost always") to 6 ("almost never"): (1) "Today I rushed through activities without being really attentive to them"; (2) "Today I did jobs or tasks automatically, without being aware of what I was doing"; (3) "Today I found myself doing things without paying attention". Items were reversed coded, and the mean was used to index mindfulness. The between-subject (i.e., R_{kf}) and within-subject (i.e., R_c) reliabilities were computed using the procedure outlined by Shrout and Lane (2012) for estimating reliability with multi-level data, and both were high ($R_{kf}=0.99$ and $R_c=0.87$). To examine the extent to which state mindful attention awareness showed day-to-day variations, we used unconditional multilevel models. This model revealed that about 54% of the variance was at the between-person level, suggesting that this variable varied reliably both at the trait and state levels.

To assess daily relational outcomes, perceived partner responsiveness (Maisel & Gable, 2009) and relationship satisfaction (Bar-Kalifa et al., 2015) were measured daily. The participants were asked to rate the extent to which they agreed with three statements ("my partner understands me", "my partner makes me feel like s/he values my abilities and opinions", and "my partner makes me feel cared for") using a scale ranging from 0 ("not at all agree") to 6 ("extremely agree"). The *mean* of these items was used to index the perceived partner responsiveness ($R_{kf}=0.99$, $R_c=0.86$). In addition, the participants were asked to rate the extent to which they currently felt (1) satisfied and (2) loved in their relationship with their partners. These items were rated on a 1 ("not at all") to 6 ("extremely") scale. The average of these items was used to index daily relationship satisfaction ($R_{kf}=0.99$, $R_c=0.79$).

Finally, to assess daily personal outcomes, both mood (Bar-Kalifa & Rafaeli, 2015) and COVID-related stress were measured daily. Participants' daily level of COVID-related stress was assessed using the mean of three items,

each rated on a 7-point scale, ranging from 0 ("not at all") to 6 ("extremely"). Participants were asked to respond to the following prompt: "Due to the COVID pandemic, to what extent did you experience X today?" The response options were (1) "tension or anxiety"; (2) "financial concerns"; and (3) "health-related concerns." The mean of these items was used to index COVID-related stress ($R_{kf}=0.99$, $R_c=0.66$). In addition, every evening, the participants were asked to indicate the extent to which they had experienced six different feelings at the current moment using a slider ranging from 0 ("not at all") to 100 ("extremely"). Three items assessed positive mood (i.e., happy, calm, and vigorous), and three negative mood (i.e., sad, nervous, and angry). The mean of the positive mood and the reversed negative mood items was used to index the daily mood ($R_{kf}=0.98$, $R_c=0.72$).

Data Analyses

Analytic Strategies

To test whether state mindful attention awareness was associated with daily personal and relational outcomes, and whether it buffered the negative effects of COVID-related stressors, we ran a series of Actor-Partner Interdependence Multilevel Models using SAS 9.4 (SAS Institute, Inc., 2013). Specifically, we followed Bolger and Laurenceau's (2013) recommendations for modeling dyadic daily data from couples. We ran a series of 2-level multilevel models (days nested within couples) and accounted for partners' non-independence by estimating the within-couple covariation in partners' level-1 and level-2 residuals. Actors' and partners' state mindful attention awareness were entered as level-1 predictors, and the main effect of actors' pre-diary COVID-related stressors was entered as a level-2 predictor. The products of the actors' and partners' state mindful attention awareness and the actors' COVID-related stressors were entered as cross-level interactions.

We ran four such models, two for the daily relational outcomes (i.e., PPR and relationship satisfaction), and two for the daily personal outcomes (i.e., Mood and COVID-related stress). All the level-1 predictors were person mean-centered, such that their effects could be interpreted as changes in outcome associated with a daily deviation from the person's mean reports over time. The level-2 predictor (i.e., COVID-related stressors) was centered on the sample's mean. In all models, we controlled for the previous day's outcome levels, which allowed us to reduce concerns as to the possibility of reverse causation. To account for partners' non-independence, we estimated separated level-2 random intercepts and level-1 error terms for men and women; this allowed us to model the within-dyad co-variation in these terms (i.e., the association between women's and their male partners' random intercepts as well

as level-1 error terms), and thus to account for partners' interdependence (see Bolger & Laurenceau, 2013). Finally, a first-order autoregressive structure was imposed on the covariance matrix for the within-person residuals. The generic within-individual (Level 1) equation was:

$$\begin{aligned} \text{Outcome}_{ki} = & \beta_{0i} + \beta_{1i}X\text{Actor State Mindfulness}_{ki} \\ & + \beta_{2i}X\text{Partner State Mindfulness}_{ki} \\ & + \beta_{3i}X\text{Outcome}_{(k-1)i} + e_{ki}, \end{aligned}$$

where Outcome_{ki} was the predicted outcome (e.g., COVID-related stress) for subject i on day k , which was predicted by this subject's actor's and partner's state mindful attention awareness (β_{1i} , β_{2i}), controlling for the level of the outcome on the previous day (β_{3i}). e_{ki} represented this subject level-1 residual term.

The generic person-level between-individual (level 2) equations were:

$$\begin{aligned} \beta_{0i} = & \gamma_{00} + \gamma_{01}\text{COVIDstressors}_i + U_{0i} & \beta_{2i} = & \gamma_{20} + \gamma_{21}\text{COVIDstressors}_i + U_{2i} \\ \beta_{1i} = & \gamma_{10} + \gamma_{11}\text{COVIDstressors}_i + U_{1i} & \beta_{3i} = & \gamma_{30} + U_{3i} \end{aligned}$$

All level-1 effects were modeled using both fixed (γ_{00} , γ_{10} , γ_{20} , γ_{30}) and random parameters (u_{0i} , u_{1i} , u_{2i} , u_{3i}). In addition, the level-2 COVID-stressor variable was included as a predictor in the equations of the intercept (γ_{01} ; representing its main effect) and the state mindful attention awareness effects (γ_{11} , γ_{21} ; representing its interactions with state mindfulness). The models also included four control variables: age, marital status, relationship length, and parenthood status.

Power Analysis

To compute the power analysis, we used the Monte Carlo simulation method advocated by Laitin et al. (2021) to calculate power in the context of multi-level models. Estimates for effect sizes were obtained from previous research (a total of 23 parameters were included in each model; see Supplementary Information Tables F-G for specific details);

in general, the effect sizes were estimated to be within the small-medium range ($0.14 < \beta < 0.42$). The simulation indicated that the data were sufficiently powered to examine Hypotheses 1, 2, and 3 (power > 0.99). The power to examine Hypothesis 4 was somewhat lower (0.69–0.72).

Results

Table 1 presents the descriptive statistics. State mindful attention awareness was positively associated with daily mood, and negatively associated with COVID-related stress and stressors. For men, it was also positively associated with daily PPR.

Actor and Partner Main Effects of State Mindful Attention Awareness

Participants' state mindful attention awareness was associated with better daily relational and personal outcomes (actor effect; see Table 2). Thus, on days in which participants reported greater state mindfulness, they reported higher PPR and relationship satisfaction, better mood, and lower COVID-related stress. In addition, participants' partners' state mindful attention awareness was associated with better daily PPR (partner effect; see Table 2). Thus, on days in which their partners reported greater state mindfulness, the participants reported higher levels of PPR. No such partner effects were found for the other three daily outcomes.

Actors and Partners Buffering Effect of State Mindful Attention Awareness

There was a significant interaction between participants' state mindful attention awareness and their COVID-related

Table 1 Means, standard deviations, and correlations for the main variables

Variable	M M (SD)	W M (SD)	1	2	3	4	5	6
1. SMAA	5.18 (0.99)	5.01 (1.06)	.11**	.05	.05	.09**	-.11**	-.05*
2. Daily PPR	5.13 (1.04)	5.15 (1.08)	.07*	.27**	.70**	.32**	.00	-.07*
3. Daily RS	5.15 (1.00)	5.07 (1.08)	.05	.79**	.18**	.33**	-.02	-.01
4. Daily mood	40.17 (28.54)	33.03 (29.38)	.09**	.30**	.32**	.27**	-.03	.01
5. Daily COVID-related stress	0.59 (0.90)	0.62 (0.94)	-.16**	-.02	-.05	-.06*	.18**	.36**
6. COVID-related stressors	1.18 (0.77)	1.18 (0.65)	-.07**	-.01	-.03	-.15**	.23**	.25**

* $p < .05$; ** $p < .01$. The diagonal shows the within-couple correlations. Values above/below show the correlations for women and men, respectively

M, man; W, woman; SMAA, State Mindful Attention Awareness; Daily RS, daily relationship satisfaction

Table 2 Estimated fixed effects of the four multi-level models

Predictor	Relational daily outcomes				Personal daily outcomes			
	PPR		Relationship satisfaction		Mood		COVID stress	
	<i>Est. (SE)</i>	<i>p</i>	<i>Est. (SE)</i>	<i>p</i>	<i>Est. (SE)</i>	<i>p</i>	<i>Est. (SE)</i>	<i>p</i>
Intercept	5.51 (0.48)	<.001	5.44 (0.44)	<.001	46.90 (11.78)	<.001	-0.04 (0.42)	0.91
COVID-stressors	-0.09 (0.09)	.28	-0.06 (0.08)	.42	-2.94 (2.45)	.23	0.40 (0.08)	<.001
Actor								
SMAA	0.06 (0.03)	.04	0.07 (0.03)	.02	3.99 (0.72)	<.001	-0.04 (0.01)	.01
COVID-stressors × SMAA	0.01 (0.04)	.67	0.00 (0.04)	.87	-1.06 (1.03)	.30	-0.06 (0.02)	.008
Partner								
Partner SMAA	0.05 (0.02)	.04	0.03 (0.02)	.09	0.74 (0.67)	.26	-0.02 (0.01)	.10
COVID-stressors × partner SMAA	0.02 (0.03)	.54	0.00 (0.03)	.79	0.64 (0.94)	.49	0.03 (0.02)	.17
Covariates								
Lagged day outcome	-0.10 (0.03)	.007	-0.10 (0.04)	.01	-0.08 (0.02)	.002	-0.13 (0.03)	<.001
Age	-0.01 (0.02)	0.48	-0.01 (0.01)	0.48	-0.60 (0.49)	0.22	0.03 (0.01)	0.09
R. length	-0.00 (0.001)	0.96	-0.00 (0.001)	0.70	0.05 (0.04)	0.18	-0.001 (0.00)	0.25
Marriage	-0.03 (0.20)	0.86	0.17 (0.18)	0.36	2.05 (4.74)	0.66	-0.15 (0.17)	0.36
Children	0.20 (0.32)	0.53	0.12 (0.29)	0.66	4.06 (7.40)	0.58	-0.23 (0.26)	0.38

SMAA, State Mindful Attention Awareness; *R. length*, relationship length

Marriage is a binary variable coded as 0 or 1, where 1 indicates the partners are married

Children is a binary variable coded as 0 or 1, where 1 indicates the partners have at least one child

stressors in predicting daily COVID-related stress (actor-actor interaction effect; see Table 2). Probing this interaction showed that the association between COVID-related stressors and daily stress was weaker on days in which the participants' mindful attention awareness was high (+ 1SD, $Est. = 0.56$, $SE = 0.21$, $p = 0.009$) vs. low (- 1SD, $Est. = 0.64$, $SE = 0.23$, $p = 0.006$). No such moderation effects were found for the other three daily outcomes (see Table 2). Finally, no moderation effects were found between one's partner's state mindful attention awareness and COVID-related stressors for any of the four daily outcomes.

Sensitivity Analysis

As a sensitivity test, we re-ran the models while excluding the age, marital status, relationship length, and parenthood status control variables. The results were identical (i.e., the significance and the estimate values of the actor and partner effects remained the same) to the one reported above (see Table C in the Supplementary Materials). Because the COVID-19-related stressors item pertaining to parental stress was only applicable to only about 20% of the sample, we re-ran models while excluding this item. The pattern of results remained essentially the same (e.g., the estimates of the actor and partner effect in the model predicting PPR changed from $b = 0.06$ to $b = 0.07$ and from $b = 0.05$ to $b = 0.06$, respectively, but remained significant; see Table D and E in the Supplementary Information for full results).

Exploratory Analysis

Though the main focus of this study was to test couples' mindful attention awareness as a potential dyadic protective factor during the pandemic, an alternative pathway suggests that a person's distress can predict the capacity to be attentionally mindful. Therefore, at the exploratory level, these potential associations were examined as well. Specifically, we estimated a set of models in which state mindful attention awareness was used as the outcome, and the personal or relational well-being indices were used as predictors. These analyses revealed that daily actor mood was associated with higher state mindfulness (actor effect). In addition, daily actor and partner COVID-related stress was associated with lower actors' state mindfulness (actor and partner effect). Daily relational well-being (satisfaction and PPR) was not associated with either actor or partner state mindfulness. The complete results are reported in the Supplementary Information (Table A).

Discussion

The current study sought to examine whether the participants' state mindful attention awareness would buffer the adverse effects of COVID-related stressors on their relational and personal well-being. The results indicated that individuals' state mindfulness was associated with better

personal and relational outcomes. It also buffered the association between COVID-related stressors and daily COVID-related stress. State partners' mindful attention awareness was less robustly associated with daily outcomes, although it was positively associated with daily PPR.

The most consistent effects found in this study involved actor state mindful attention awareness. Across outcomes, it was associated with better relational and personal outcomes. Daily state mindful attention awareness was associated with lower COVID-related stress, better mood, relationship satisfaction, and PPR. Whereas most previous work documenting the beneficial effects of mindfulness has focused on trait-level mindfulness (Harvey et al., 2019; Karremans et al., 2020), the current findings suggest that within-person variations in mindfulness are also important to consider in predicting people's well-being (see also Brown & Ryan, 2003).

Though not directly assessed in the current study, a few potential mechanisms could explain the beneficial interpersonal effects of actors' state mindful attention awareness. First, more adaptive conflict-related processes may account for the beneficial relational effects of mindfulness. Mindful awareness helps people de-center from negative, distressing emotions and accept them better (Bishop et al., 2004). This acceptance often facilitates the use of better conflict strategies (e.g., accommodation; Harvey et al., 2019) and forgiveness (Johns et al., 2015). Thus, on days in which the participants experienced greater mindful awareness, they may have been able to tolerate relational tension better and therefore experienced better relational outcomes.

The positive intrapersonal effects of mindful awareness can be interpreted in terms of findings reporting a robust association between mindfulness and the use of constructive emotional regulation strategies. Mindfulness was shown to be associated with emotional metacognitive awareness; i.e., the ability to see thoughts and feelings as transient mental events, instead of identifying with them and considering them as an accurate representation of reality (Hayes et al., 1999; Shapiro et al., 2006). This awareness was found to be associated with lower levels of rumination (Jain et al., 2007) and higher levels of self-compassion, both of which were found to mediate the association between mindfulness and personal well-being (Coffey & Hartman, 2008; Voci et al., 2019).

We further predicted that actors' state mindful attention awareness would moderate the association between COVID-related stressors (i.e., the objective difficulties burdening participants; financial strain) and personal and relational outcomes (the affective responses to such stressors). The findings showed that COVID-related stressors were only significantly associated with higher COVID-related stress, and that actor state mindful attention awareness moderated this association.

This finding is in line with previous results documenting the stress-buffering effect of mindfulness (Bergin and

Pakenham, 2016; Lucas-Thompson et al., 2020). However, whereas previous studies have focused on the mindfulness buffering effect at the trait (between-subject) level, the current study documented this effect at the state (within-person) level. Specifically, we found that on days where participants reported a within-person increase in state mindful attention awareness, the association between COVID stressors (e.g., health burden, financial burden) and daily COVID stress (e.g., tension, financial concern, health concern) was weaker.

The literature on the effect of partners' mindfulness is much more limited and has solely focused on trait-level (vs. state-level) partners' mindfulness (Gobout et al., 2020; Iida & Shapiro, 2019). Premised on findings showing that the process of coping with stress is highly systemic (i.e., interdependent) in romantic relationships (Bodenmann, 2000), we expected that partner's state mindful attention awareness would exert a beneficial effect on the other partner's outcomes. Partial support was found for this prediction: partner mindful attention awareness was associated solely with higher daily PPR, though it did not translate into higher daily relationship satisfaction.

PPR reflects the perception that one's partner understands, values, and cares for the other's core self and personal needs and goals (Reis, 2007). Previous work has shown that mindfulness facilitates constructive interpersonal behaviors (Harvey et al., 2019; Hertz et al., 2015; Karremans et al., 2020). Thus, partners' mindfulness was expected to be linked to this relational virtue (vs. more globally to relational satisfaction or personal mood). Specifically, on days in which the partners experienced greater mindful awareness, it is likely that they were more emotionally regulated and present in their interactions, and thus more available to address their partners' needs, who perceived them as more responsive. The final hypothesis focused on the moderating effect of partners' state mindful attention awareness. This prediction was not supported. One possible explanation is that it takes more time for partners' mindfulness to have a beneficial and meaningful effect on the other partners' personal outcomes.

The Karremans et al. (2017) model can be used as a general framework for interpreting the results of the current study. As noted above, this framework contends that several basic mindfulness-related mechanisms (e.g., awareness of implicit processes, emotion regulation) foster beneficial relationship-related processes (e.g., pro-relationship cognitions and motivations). Specifically, the actor effect of state mindfulness on one's personal outcome (better mood, lower stress) can be understood as reflecting the effect of basic mindfulness mechanisms. For example, mindfulness was found to foster people's capacity to regulate their emotions and stress (Iani et al., 2018). The buffering effect of actor's state mindfulness can be seen as reflecting the effect of awareness of implicit processes. For example, being aware

of the COVID-related stressors people face could improve their capacity to cope with these stressors more adaptively and thus to experience less personal and relational distress (for similar ideas, see Neff et al., 2021). Finally, the actor and partner effect of state mindfulness on an individual's PPR may reflect the effect of mindfulness on relationship processes. For example, mindfulness was found to foster pro-relationship cognitions and motivations (Hertz et al., 2015).

Limitations and Future Directions

Several limitations of the current study are worth mentioning. The couples in the current study were sampled during the early phase of the pandemic, probably before their resources had been significantly depleted. With time, COVID-related stressors are likely to become chronic and thus spill over to exert deleterious effects on relationships (Neff & Karney, 2017; Neff et al., 2021). Additionally, we developed a brief measure of COVID stressors soon after the outbreak of the pandemic and thus was lacking sound psychometric validity (for example, it failed to capture stressors related to the social domain, a major challenge triggered by the pandemic; Tambling et al., 2021). Thus, to better clarify the potential buffering effect of mindfulness, it should be examined in the context of couples facing enduring and chronic levels of stressors (e.g., job loss due to the pandemic), using a more psychometrically sound measure.

In addition, the couples who participated in the current study were, on average, quite satisfied with their relationships. This limited variability may undermine the generalizability of the results. Relatedly, the recruitment method involved undergraduate students approaching couples with whom they were acquainted (e.g., friends, relatives). This type of convenience sample poses a threat to the generalizability of the results and their application to more distressed clinical samples. Note, however, that the current study focused on a within-person analysis which explored fluctuations within participants' state-level experiences; therefore, the sample is likely to have been informative in this regard (Bolger et al., 2003). In particular, the sample was similar to samples used in other studies examining couples' daily processes (e.g., Debro et al., 2014; Shrout et al., 2006) in terms of couples' age, marital status, and educational level. This, to some extent, alleviates concerns about the current sample's representativeness.

Another limitation is related to the measurement of mindfulness. To assess daily fluctuations in state mindful attention awareness, the current study utilized an abbreviated version of the MAAS (Brown & Ryan, 2003), one of the most frequently used instruments (Quinn-Nilas, 2020) that implements a widely accepted definition of mindfulness as present-focused non-judgmental attention (Bergomi et al.,

2013). Previous studies have demonstrated the validity of this instrument in capturing within-person variations (Brown & Ryan, 2003). However, unlike Brown and Ryan, to reduce burden, we used three (vs. five) items and measured mindfulness every night (vs. three times a day). This may raise concerns as to the internal validity of our measures.

Additionally, Brown and Ryan (2003) developed the MAAS premised on the idea that mindfulness should be conceptualized as a unidimensional construct. However, others have argued that mindfulness should be represented as multifaceted construct, raising concerns regarding the content validity of the measure used in our study. Baer et al. (2008) suggested that mindfulness involves five components: (a) describing, (b) acting with awareness, (c) non-judgment, (d) non-reactivity, and (e) observing. Although these facets are moderately correlated, they show divergent associations with relational outcomes. For example, in a cross-sectional survey study, nonjudgment of inner experience was associated with the actor's relationship satisfaction, whereas non-reactivity to inner experience was associated with both actor's and partner's relationship satisfaction (Lenger et al., 2017; see also Iida & Shapiro, 2019). Thus, even though different mindfulness measures tend to load onto one overarching dimension (Siegling and Petrides, 2014), more work is needed to examine how specific aspects of mindfulness may be differentially linked with salubrious relational outcomes.

Furthermore, we did not assess participants' mindfulness meditation practice during the study period, which may account for within-person fluctuations in state mindfulness. Assessing mindfulness practice along with a more intensive assessment of state mindful attention awareness could contribute to clarifying the directionality of the associations found in the current study. For example, assessing mindfulness practice in general as well as at the daily level may further clarify the directionality (or even causality) of the effects (e.g., after practicing mindfulness, do partners report higher levels of daily relationship satisfaction?).

Relatedly, collecting several assessments each day would make it possible to test whether mindful awareness assessed at one point prospectively could predict improvement in relationship satisfaction at the following assessment point, or, alternatively, whether experiencing personal and relational distress would prospectively predict lower state mindful awareness. Several studies have found that psychological distress predicts lower mindfulness (Murphy et al., 2012; Royuela-Colomer et al., 2021; Zimmaro et al., 2016). In the current study, the exploratory analyses indicated some support for the claim that personal well-being (or distress) was indeed associated with state mindful attention awareness. Relational well-being, in contrast, was not associated with mindful awareness. Furthermore, neither personal nor relational well-being buffered the association between COVID-related stressors and state mindful awareness. This pattern of results may suggest that mindfulness should be regarded

as a resource that contributes to better well-being through both its direct effect and its buffering effect, whereas the link from well-being to increased mindfulness was less robust.

It should be noted, however, that the current study drew on the Vulnerability-Stress-Adaptation model (Pietromonaco & Overall, 2021), and was guided by the idea that mindfulness may buffer the toxic effects of stressors on people's well-being (e.g., Carpenter et al., 2019), which may help couples traverse the current stressogenic period. Thus, the state mindful attention awareness items were worded to reflect the participants' experiences during the day that had just elapsed (e.g., "Today I rushed through activities without being really attentive to them"). In contrast, items tapping relational/personal well-being were worded to reflect the participants' end-of-day experience at the time of completing the questionnaire (e.g., their current mood when filling out the diary, an hour before going to sleep). The only exceptions were the items tapping daily COVID-related stress, which were worded to capture participants' stress during the day that had just ended. Therefore, it is unsurprising that daily COVID-related stress was the only variable in which both the actors' and the partners' bi-directional effects emerged. Future studies should take these potential bi-directional associations into account, to provide a better theoretical understanding of the temporal associations between mindfulness and personal/relational well-being.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s12671-022-02025-z>.

Author Contribution YP designed and executed the study, analyzed the data, and wrote the paper. BD collaborated on the writing of the manuscript and revisions. EBK contributed to the conceptualization of the study and assisted with the data analysis, manuscript writing, and revision.

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Data Availability All data are available at the Open Science Framework: https://osf.io/d3kvt/?view_only=7bafbc77d8f4893b8870ed768129ca1

Declarations

Ethics Approval Ethical approval was given by the psychology department Ethics Committee under the delegated authority of the Ben-Gurion University's Human Subjects Research Ethics Committee.

Informed Consent All participants provided consent to the current study by signing a consent form presented to them before the beginning of the study.

Conflict of Interest The authors declare no competing interests.

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